

【Drawing】

【Fig. 1】

MSB-first Multiplication Algorithm Over $GF(2^m)$

Input : $A(x), B(x), G(x)$

Output : $P(x)=A(x)B(x) \bmod G(x)$

1. $p_k^{(0)}=0$, for $0 \leq k \leq m-1$
 2. $p_{-1}^{(i)}=0$, for $1 \leq i \leq m$
 3. for $i = 1$ to m do
 4. for $k = m-1$ to 0 do
 5. $p_k^{(i)} = p_{m-1}^{(i-1)} g_k + b_{m-1} a_k + p_{k-1}^{(i-1)}$
 6. end
 7. end
 8. $P(x) = p^m(x)$
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【Fig. 2】

Division Algorithm Over $GF(2^m)$

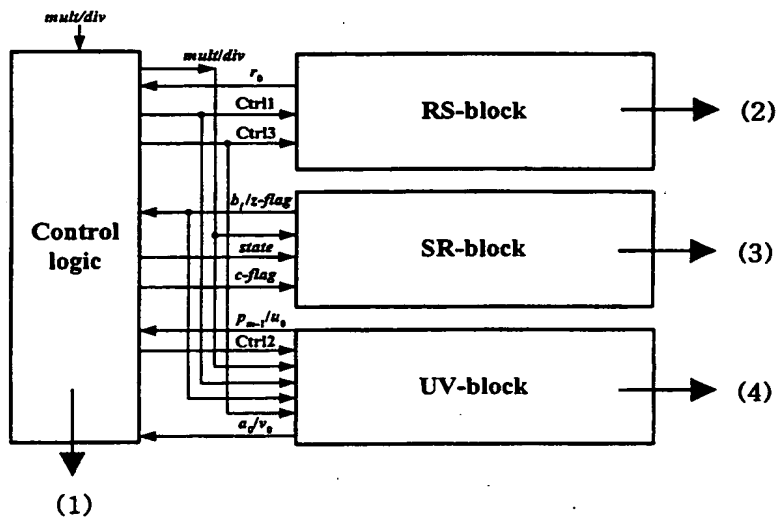
Input: $G(x), A(x), B(x)$

Output: V has $P(x)=A(x)/B(x) \bmod G(x)$

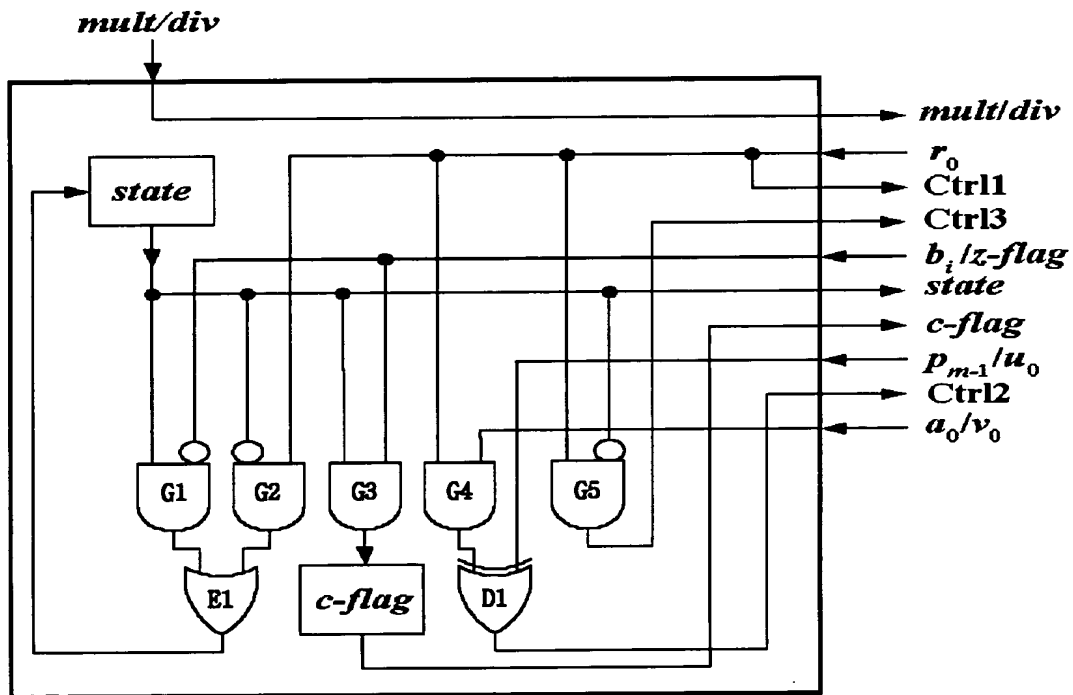
Initialize: $R=B(x), S=G(x), U=A(x), V=0$,
 $count=0, state=0$

1. for $i = 1$ to $2m$ do
 2. if $state == 0$ then
 3. $count = count+1$;
 4. if $r_0 == 1$ then
 5. $(S, R)=(R, R+S); (V, U)=(U, U+V)$;
 6. $state = 1$;
 7. end if
 8. else
 9. $count = count-1$;
 10. if $r_0 == 1$ then
 11. $(S, R)=(S, R+S); (V, U)=(V, U+V)$;
 12. end if
 13. if $count == 0$ then
 14. $state = 0$;
 15. end if
 16. end if
 17. $R = R/x$;
 18. if $u_0 == 0$ then
 19. $U = U/x$;
 20. else
 21. $U = (U+G)/x$;
 22. end if
 23. end for
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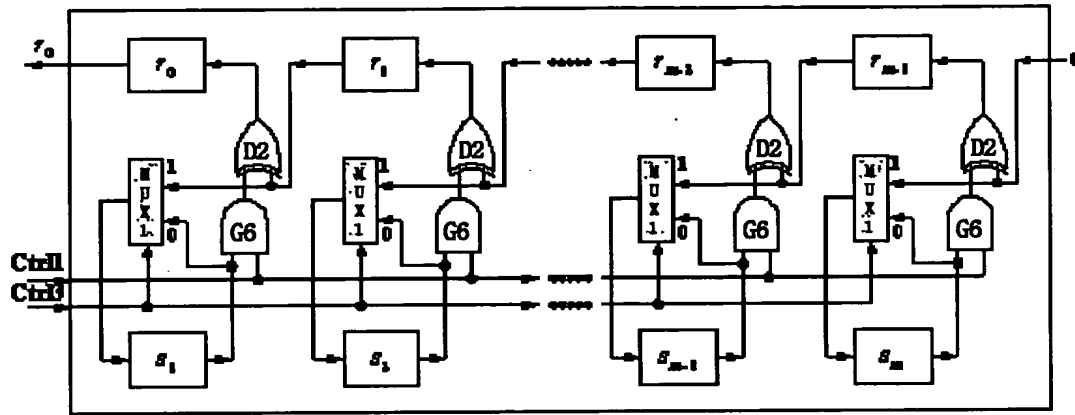
【Fig. 3】



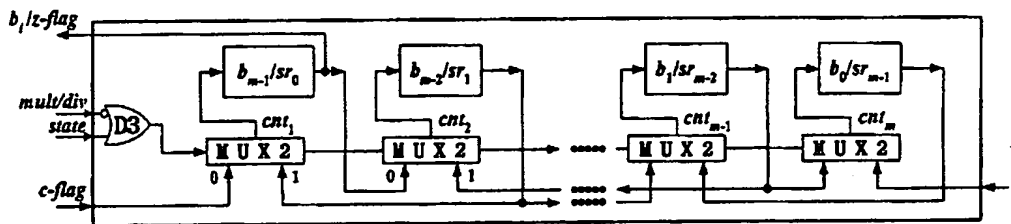
【Fig. 4】



【Fig. 5】



【Fig. 6】



【Fig. 7】

